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Introduction

Some fixed gear fisheries that are observed on the West Coast are conducted on very small vessels which present unique sampling situations. These situations are most often encountered in nearshore fisheries, such as live rockfish and cabezon, although they may also occur on small boats targeting sablefish or other deepwater fish.

Although some adaptations may be necessary to collect required data on small boats, the same basic sampling protocols are followed for all fixed gear vessels. For general instructions on data collection on fixed gear vessels, refer to Chapter 5, *Fixed Gear Sampling*. Chapter 6, *Fixed Gear Sampling on Small Boats* will address specific challenges and data collection techniques for smaller fixed gear vessels.

Fixed Gear Types Encountered on Small Boats

Fixed gear types encountered on small boats have the following WCGOP Gear Type Codes and each gear type is reviewed in the following section.

7	Vertical hook and line
8	Pole
9	Other hook and line gear
10	Fish pot
15	All troll gear
16	All other miscellaneous gear
19	Longline (fixed hooks)
20	Longline (snap-on hooks)

Gear Type 7-Vertical Hook and Line

Vertical hook and line (also known as vertical longline or Portuguese set) is a type of hook and line gear that consists of a single line weighted at the bottom and buoyed at the surface, with 25 to 300 hooks suspended in the water column to fish vertically. Baited hooks are tied to the mainline (See Figure 6-1).

Figure 6-1: Vertical Hook and Line Gear

Wind and waves jiggle the buoy, which wiggles the line and hooks to attract fish. Vertical longline gear is typically used to target rockfish. Many individual units can be set in a general area being pulled and reset multiple times making it hard to keep track of individual sets.

Gear Type 8 - Pole (Commercial) / Rod and Reel Gear

Rod-and-reel fishers use traditional fishing poles, usually with one or more hooks per pole (See Figure 6-2). Bait, flashers and a variety of lures may be used to attract fish to the hooks. Two common types of fishing lures are large plastic worms called "scampies" and plastic lures that resemble squid called "hoochies". Lines are weighted with lead sinkers of different shapes and sizes. When multiple hooks are fished, each hook may be fished from

a “dropper” line, or gangion, attached to the main fishing line. Weighted lines with hooks are cast into the water and allowed to descend to the desired depth, typically on or near the sea floor. Lines may be cast while the vessel is at anchor or drifting, or lines may be actively trolled while the vessel is under-way.

For data entry purposes, we only use the term “rod-and-reel” to describe fishing that occurs while a vessel is at anchor or drifting. If the vessel is trolling (moving by power) and using rod-and-reel gear, we classify the gear type as “15 - troll gear”. (Refer to description of troll gear.) Rod-and-reel gear is commonly used to target rockfish, sheephead, lingcod, greenling, cabezon and sanddabs.

Figure 6-2: Rod-and-Reel Gear and Catch

Gear Type 9 - Other Hook and Line Gear
Stick, Pipe, and Cable Gear

Stick gear, also called pipe gear, is usually constructed of a piece of rebar (metal stake) or a weighted PVC tube and line attached along the full length of the stick and connected to a buoy (See Figure 6-3). Some fishers use a flexible plastic-coated cable with a lead weight attached instead of a hard stick, referred to as “cable gear”. The sticks may vary from 3 to 15 ft. in length, and the number of hooks per stick or cable may vary from 3 to 10. Hooks are attached directly to the line by a lighter piece of line or monofilament and are typically baited with squid, mackerel, or bonita. There is usually just one stick per buoy line, but multiple sticks can be connected together by a groundline. This gear is typically used on shallow reefs, rock piles, or kelp and surf grass beds at depths of 0 to 40 feet, but is occasionally fished at depths of 100 feet or more. Stick, pipe and cable gear are primarily used to target nearshore rockfish, lingcod, greenling and cabezon.

Figure 6-3: Stick Gear

Handlines and Jigging

Handline and **jig** fisheries use vertical, weighted monofilament lines with baited hooks attached at intervals with swivels. The hooks are dressed up with colorful segments of rubber surgical tubing, “hoochies”, or bait (squid, herring or other fish). The jig is dropped to the bottom either by hand or with mechanical gear. Then the line is usually lifted a short distance off the bottom and jigged vertically up and down to lure the fish to bite the bait or hoochies.

Jigging: A method of fishing where fishing line is mechanically manipulated. The movement of the line creates a bouncing of the lure within the water column or along the substrate.

In this chapter, pots are referred to as **traps**, as that is the common terminology used by fishermen.

Mechanical jigs are automated to let out and reel in line as programmed. They can be programmed to sense when the gear hits the seabed and automatically pull in enough line so that the hooks stay a few feet above the bottom to avoid snagging. When the pre-set weight of fish has been hooked, the jigger can automatically reel in the line. Mechanical jiggers will generally utilize between six and sixteen hooks on separate gangions, and many lines can be actively jigged. Handlines and jigs are commonly used to harvest lingcod, greenling, cabezon and rockfish.

For data collection purposes, this type of gear could be classified in a couple of different categories. If the vessel is stationary or drifting and using fishing poles, then this should be recorded as "8-Pole/Rod and Reel". If the vessel is under way, this would be considered "15-Troll Gear". (See descriptions below) If the fishing activity cannot be described by "rod-and-reel" or "troll gear", it should be recorded as "9-Other Hook and Line".

Gear Type 10 - Fish Pots / Traps

Traps used on smaller vessels are typically lightweight rectangular traps (See Figure 6-4), although other configurations may also be encountered. Small trap vessels typically fish for live fish markets. Common nearshore target species are California sheephead, cabezon, greenling, rockfish, and California scorpionfish. Some small vessels also use traps to target sablefish in deeper waters.

Figure 6-4: Sheephead Trap

Gear Type 15 - All Troll Gear

Trolling involves towing multiple fishing lines behind a vessel while it is under way (See Figure 6-5). Lines are attached to a pair of **outriggers** that are lowered to approximately 45-degree angles from the boat when fishing.

Fishing lines are set and retrieved using **gurdies** mounted on the vessel in sets of two, three or four. Each gurdy spool, usually powered by hydraulics, contains and works one line.

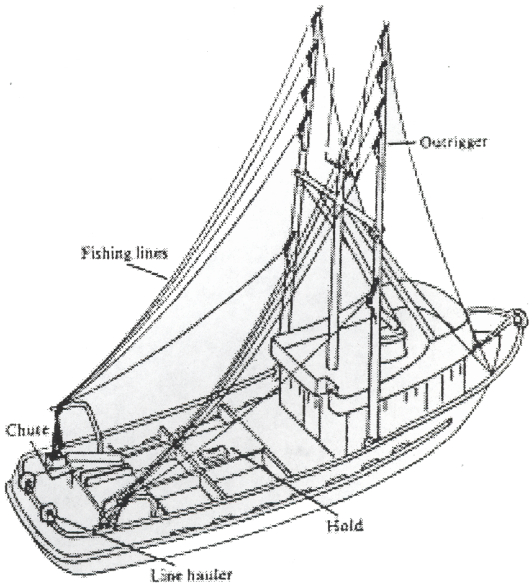


Figure 6-5: Troll Gear (with outriggers in non-fishing position)

Groundfish Troll Fishery

Groundfish are targeted with other troll gear configurations. The lines are typically weighted with some sort of lead weight or bar and fished at or near the sea floor. Groundfish gear may resemble that of an albacore troller, but may also consist simply of weighted rod-and-reel lines with hooks being dragged along the bottom of the ocean. Multiple jigs or baited hooks may be attached to the troll line by leaders or gangions. A variety of fishing lures, such as hoochies and scampies, are also commonly used. To target rockfish congregating at different depths and around rock pinnacles, some troll gear configurations utilize floats to keep the hooks suspended in the water column. By adjusting the floats, weights, length of main line and location of gangions, the hooks can be set up to fish at a range of depths within the desired band (See Figure 6-6).

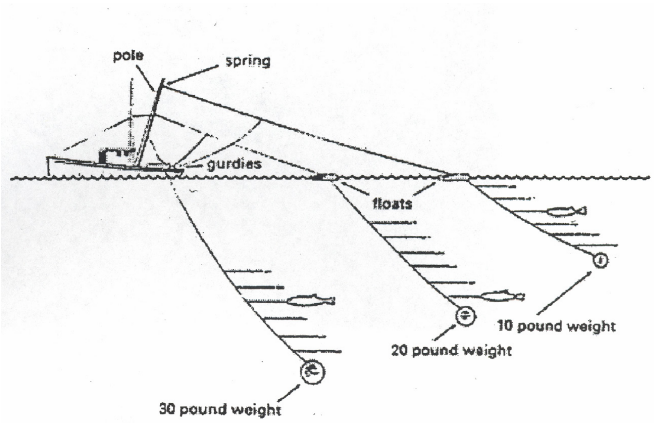


Figure 6-6: Groundfish Troll Gear

One type of groundfish troll gear is sometimes called 'dingle bar' gear because there is a distinct 'ding' transmitted up the steel trolling wire any time the bar touches bottom. The gear is designed to be fished three to six feet above rocky bottom and the iron bar is allowed to touch the bottom only occasionally to adjust for varying depths. Jigs are hung from multiple gangions attached to each line. The jigs have fishing lures, and are sometimes tipped with bait. This gear is very selective and is primarily used to target lingcod.

Gear Type 19 - Longline Gear (fixed hooks)

See Chapter 5, *Fixed Gear Sampling*.

Gear Type 20 - Longline Gear (snap-on hooks)

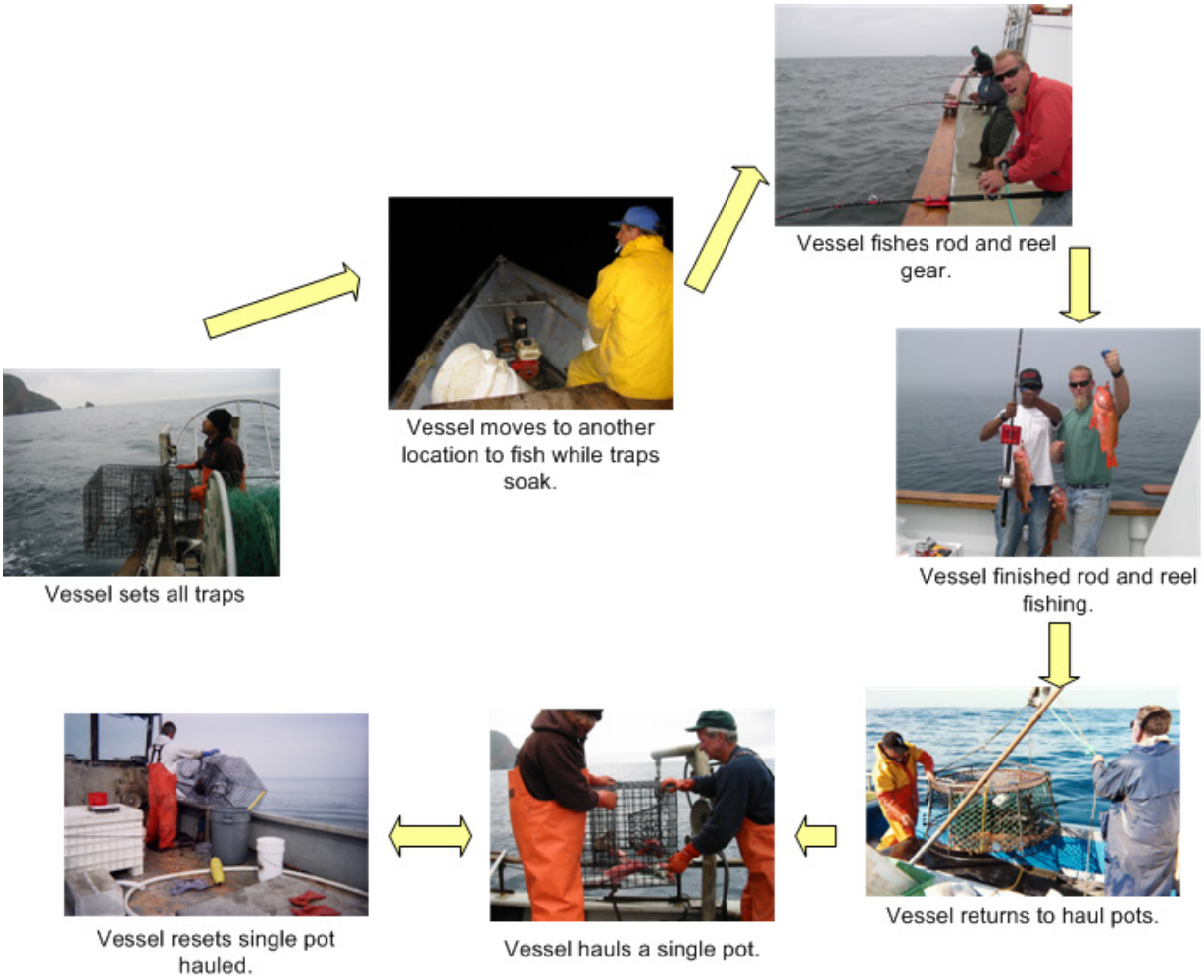
See Chapter 5, *Fixed Gear Sampling*.

Outrigger: A stabilizing frame extending laterally beyond the main structure of the vessel.

Gurdies: Powered spools or reels.

Small Fixed Gear Vessels

Operations on Small Fixed Gear Vessels



Safety on Small Boats

Observers should be aware of unique safety issues that arise on small vessels. Small vessels are often not required to carry the same amount and types of safety gear as larger vessels, especially when they are only operating within 3 miles of shore. These vessels also run a higher risk of capsizing. When moving about on the vessel, take note of how much your movement causes the vessel to rock back and forth. On very small vessels, sudden

movement could cause you or someone else to fall overboard. Carefully stow your EPIRB and immersion suit, and wear a Personal Flotation Device (PFD) at all times. Observers who work on a lot of small boats can request to be issued a Personal Locator Beacon (PLB). It can be carried on a person or attached to a PFD.

These vessels generally fish under good weather conditions, but conditions can change quickly. There is often little or no shelter on small boats, so if the wind or waves pick up, you can get soaked quickly. Do not neglect to bring along raingear and wear clothing that is easily layered. It is also good to bring drinking water, sunscreen and a hat to protect from sunburn and dehydration. Remember, you may have no shelter from the weather or sun all day.

Gear for Small Boats

Carefully consider what gear to bring when observing on vessels with extremely limited space. Many small vessels only make one-day trips. It isn't necessary to bring much personal gear on board, but remember to be prepared for changing weather conditions.

Working on small vessels requires a good working relationship with the fisher. Ask for their help in determining where to be while under way (not fishing) and a sampling location that will minimize interference with fishing operations.

On most small boats, there is very little room. Observers commonly find that they can pack all of the sampling gear they will need into a single observer basket plus their scale. The goal is take up as little space as possible without compromising your ability to collect the required data. The following is a list of sampling gear needed on small vessels:

- Marel digital scale
- Lightweight bucket with holes drilled in the bottom or an observer basket
- Portable GPS unit.
- Length Frequency board.
- Clipboard, deck forms, and other items normally used to collect and record data.

Although vessels are normally expected to provide food for observers, fishermen who day trip are less likely to provide food and drink. Discuss this before the trip or plan to bring enough drinks and snacks to get through the day.

Duties and Priorities on Fixed Gear Vessels

1. Record incidental takes and collect appropriate biological information from protected species: marine mammals, sea turtles, seabirds, green sturgeon, and salmon.
2. Record interactions of marine mammals, sea turtles, and seabirds with fishing gear.
3. Record fishing effort information, including location, time date, and depth for all hauls/sets.
4. Conduct hook counts per segment, or count all hooks.
5. Verify total segments per set.
6. Tally sample for species composition:

a. Tally sample 100% of the gear for species composition.

- If this is not possible a minimum of 50% of the gear is to be tally sampled.

b. Count all retained and discarded organisms by species, or species group.

c. Verify the number of segments, or hooks, in your sample.

d. Sample Pacific halibut:

- Estimate the length of all PHLB (longline vessels).
- Measure all PHLB (trap vessels).

e. Tally sample discards by discard reason.

f. Obtain weights of fish:

- Target species: obtain an average weight subsample of at least 30 individuals
- Bycatch species: Weigh all individuals
- If this is not possible, take a minimum subsample of at least 15 individuals for average weight.

7. Complete an IFQ Priority Species Tracking Form for every haul.

Priorities 1- 7 must be completed on ALL hauls

8. Record weight, length, sex, and take necessary dissections from tagged fish.
9. Complete species identification forms.
10. Maintain observer logbook.
11. Take biological samples, including viabilities, length, sex, otoliths, tissue, etc. from discarded individuals.
12. Document sightings of ESA listed species.
13. Document sightings of non-ESA listed marine mammals and seabirds.
14. Enter data within 3 days of disembarking and complete all data forms.

Data Collection on Small Fixed Gear Boats

The fisheries that small fixed gear vessels participate in include:

- Non-Sablefish Endorsed (limited entry)*
- OR Nearshore (open access)
- OR Rockfish (open access)
- CA Nearshore (open access)
- WC Open Access Fixed Gear (open access)

*The non-sablefish endorsed feet commonly use conventional longline gear or strings of pots to fish.

The data flow on small fixed gear vessels is generally the same as for large fixed gear vessels. (See Chapter 5, *Fixed Gear Sampling*.) The primary differences are due to the following factors:

- Defining a set and recording location information is less straightforward on small boats.
- Determining the amount of gear in a set is often complicated by repeated sets and retrievals of small units of gear.

The data flow for sampling small fixed gear vessels is:

1. Defining a Set.
2. Documenting Fishing Effort Information.
3. Determining Amount of Gear in a Set.
4. Tally Sampling.
5. Recording Catch, Species Composition, Fishing Effort Information.

Defining a Set

Unlike vessels using traditional longline and pot gear with two end buoys, defining a set on vessels that use other types of fixed gear can be somewhat complicated. Small pieces of gear with individual buoys are often set haphazardly in a general area or fishing spot. The gear is frequently set and retrieved over and over again, with individual pieces of gear soaking for as little as 5 minutes between retrievals. If each retrieval was considered a set, one day of fishing could have over fifty sets, with each set only having one or two fish caught. Obviously, this would create an unreasonable quantity of paperwork for the amount of data collected. Therefore, individual pieces of gear can be grouped to form a single set using a standard set of criteria. When it is not possible to easily define a set as the retrieval of a distinguishable string of gear, any grouping of gear that meets all of the following criteria can be considered one set:

1. **Date**: Data collected on the same day can be considered for grouping into a set. If the vessel is fishing for multiple days, data from each day should be grouped separately.
2. **Gear type**: Data collected from the same gear type can be considered for grouping into a set. **If more than one gear type is being used, data must be recorded separately for each gear type**.
3. **Geographical area**: Data that is collected in the same general area can be considered for grouping into a set. An area may be defined by a physical feature, such as a cove or reef or it may simply be defined by distance. There is not an assigned distance used to determine if data should be recorded separately or together. Dividing data into separate hauls based on geographical area is up to the discretion of the observer. If unsure how to record the data, discuss the situation with your Debriefer.
4. **Depth**: Data that is collected in the same depth range can be considered for grouping into a set. Like geographic area, there is not an assigned depth change that requires data being recorded in separate sets. However, if the species composition or fish size changes noticeably, the depth has changed enough for the data to be grouped separately.
5. **Species**: Data that is collected that has the same target species or species assemblage can be considered for grouping into a set. Any noticeable change in species composition requires the data to be grouped separately.

The following three criteria are often closely related and should be considered together when deciding if data can be grouped:

- Geographical area
- Depth
- Species

Documenting Fishing Effort Information

Fixed gear vessels are not required to keep vessel logbooks. There are two options for getting fishing effort information which consists of haul location, depth and time information:

A grouping of gear can be considered one set if the following are the same:

- Date
- Gear type
- Geographic area
- Depth
- Species assemblages

1 fathom = 6 feet

- Skipper's personal logbook: Most small boats do not keep records of fishing locations and depths.
- Observer collects information.

Recording Locations

If the vessel does not keep a logbook, there are two sources for location information:

1. **Vessel equipment**: Many vessels have Loran or GPS devices, but be wary of using location information from electronic devices on small boats as they are sometimes inaccurate.
2. **Handheld GPS**: You may be issued a handheld GPS unit for noting haul locations. These devices have handy features that allow you to save positions as way points that you can reference later. Write down the positions or way points on the back of your Catch Form at the same time that time and depths are noted.

Recording Depth

To determine fishing depths either:

1. Use the vessel's depth finder (preferred).

OR

> **Tip**: Check to see if the depth is displayed in feet or fathoms. If the vessel is fishing in a nearshore fishery, the depth will mostly likely be displayed in feet.

2. Use locations and chart: If the vessel does not have a depth finder, use position information (lat/longs) and charts to estimate fishing depths.

> **Tip**: Record the depth range, the shallowest depth to the deepest depth.

Recording Time

If the vessel does not have a logbook observers can record the times from their watch or the vessel's clock. There are times when gear is set on the previous trip. Observers can ask the captain for the set times or ask the observer from the previous trip for this information.

At minimum, for each set record:

- Location, depth and time of first gear to be deployed.
- Location, depth and time of final gear retrieval.

> **Tip**: If you don't write it down as it is happening, you will not have critical information needed to complete your data forms.

Additional Fishing Effort Information

Write down additional locations, times, and depths as the vessel moves around throughout the day, being sure to note starting and end positions if there are multiple hauls. Marking multiple way points in a handheld GPS is a convenient way to look at where the vessel moved throughout the day, and may help determine if data should be divided into separate hauls.

Observers must document at least two positions (start and end) if there was only one haul in a day. Additional location, time, and depth information can be taken any time during the day but information that is evenly spread out (every hour) is the most representative of vessel activity. The observer should attempt to document positions that mark the boundaries of the general fishing area rather than multiple positions in nearly the same spot. If the vessel doesn't move around very much, fewer positions need be recorded.

Tip: The additional information must be recorded on the Trip Form – Haul Locations and entered into the database. See the Trip Form – Haul Locations instructions at the end of the chapter.

Determining Amount of Gear in a Set

Once you have defined the set, the number of hooks or traps in the set must be determined. To determine the amount of gear in a set on small fixed gear vessels, determine the:

1. Number of hooks or traps per gear segment.
2. Number of gear segments in a set.

Tip: On small boats, it is usually possible to sample 100% of the gear. Therefore, the total number of hooks or pots will be equal to the number of hooks or pots sampled, unless gear has been lost.

Determining the Number of Hooks per Gear Segment

Two approaches can be used to determine the number of hooks per **gear segment**:

- Average number of hooks per gear segment.
- Actual number of hooks per gear segment.

Average number of hooks per gear segment:

Vessels generally have a consistent number of hooks per gear segment. Hook counts should be done at least once per trip. Always document in the Observer Logbook when average hook counts were done and why that time was chosen. To determine average number of hooks:

- Count the number of hooks in each gear segment. If it is not possible to count all of the gear, a minimum of 1/5 of the gear should be counted and an explanation of the circumstances that made it impossible to count all of the gear should be documented in the Observer Logbook.
- Sum the hook counts for all gear segments counted and divide by the number of gear segments counted to determine the average number of hooks per gear segment.

Calculation

$$\text{Average \# Hooks per Gear Segment} = \frac{\Sigma\text{Hooks Counted}}{\text{\# of Gear Segments Counted}}$$

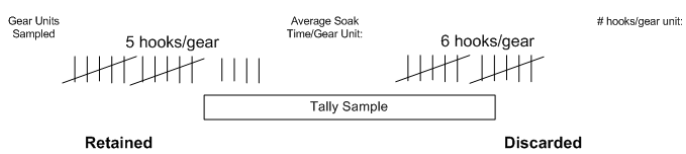
Calculation

$$\text{Total Hooks} = (\text{Total Gear Segments}) \times (\text{Average Hooks per Gear Segment})$$

Actual Numbers of Hooks per Gear Segment

If sets are composed of gear segments with varying numbers of hooks, it may be possible to keep track of the actual number of hooks retrieved rather than using average counts. To use actual counts:

- Create columns on your raw data sheet with each possible hook count (per gear segment, see example below).
- Each time gear is retrieved, put a tally mark in the column with the correct number of hooks that are present.
- When the set is complete, count the total number of hooks retrieved by multiplying each tally by the corresponding number of hooks and sum the results



Gear segment: A single tub, pole, cable or other unit of gear.

Counting hooks on rod-and-reel vessels

When multiple lines with various hook counts are fished simultaneously, it may not be possible to keep track of each retrieval while also collecting species composition data.

In this situation, the number of hooks may be determined by using a random temporal sampling strategy:

1. Determine an appropriate length of time for the hook count sampling periods.
2. Randomly select time units when gear retrievals will be counted.
3. Count the number of gear retrievals that occur during the selected sample periods.
4. Multiply the number of gear retrievals by the average or actual numbers of hooks per gear segment (as described above) to determine the total number of hooks retrieved during the randomly selected time period.
5. Determine the total amount of time that fishing occurred for the set.
6. Extrapolate the number of hooks retrieved during the random sample periods to the total fishing time to estimate the total number of hooks in the set.

Calculation

$$\text{Total Hooks} = \frac{(\text{Total \# Hooks in Sample}) \times (\text{Total Time (min) of Set})}{\text{Minutes Elapsed During Hook Count Sample Periods}}$$

Number of gear segments in a set

Determining the number of gear segments in a set depends upon how a vessel is fishing. Many small vessels set and haul the same gear segments multiple times in the same set. When this fishing pattern is observed, gear should be counted each time it is set and retrieved. The number of gear segments is the total number set rather than simply the total amount of gear being used to fish.

Example: If a segment of gear is set and retrieved 5 times in the same set, that piece of gear is counted 5 times rather than once when determining the total amount of gear in the set.

Multiple Retrievals in a Set

There are two options for counting the number of gear segments in a set when a vessel hauls and sets the same gear segments multiple times:

1. Count each gear segment retrieved, accounting for gear that is lost (not retrieved).
2. Count each time a gear segment is set.

   Tip: To keep track of the total amount of gear in the set, tally the number of sets or retrievals on the back of the Catch Form with the raw data.

Single Retrieval per Set

Some vessels will set the gear one time for a defined set. If the gear is set and retrieved only one time in a set, the options for counting gear segments are similar to options used on traditional longline and pot vessels:

1. Count hooks/traps while they are being baited.
2. Count hooks/traps while the gear is stored on the vessel.
3. Count hooks/traps during gear deployment (the setting of gear).
4. Count hooks/traps while gear is being retrieved. This

Actual number of hooks per gear segment are often collected for stick, rod-and-reel and similar gear types.

can be extremely difficult on hook and line vessels, especially when you need to sample for species composition at the same time. Also, counting hooks in the evening, morning, and night can be difficult due to available light.

Unlike on larger, traditional longline and pot vessels discussed in See Chapter 5, *Fixed Gear Sampling*, counting hooks or traps during the retrieval of an unsampled set is not typically an option on small vessels because the observer will generally sample all hauls. (See Chapter 5, *Fixed Gear Sampling* for more information on determining the amount of gear in a set on longline vessels.)

Sampling Small Fixed Gear Vessels

Tally sampling (counting all the retained and discarded catch) on fixed gear vessels is conducted as the gear is being retrieved. When tallying on a line vessel, the observer counts every individual that comes up on the line, including drop-off s. When tallying on a pot vessel, the observer counts every individual in a pot.

Tally Periods

Small Fixed Gear vessels generally haul very little gear per day and catch less than 1000 lbs of fish per day. For that reason, hauls are 100% tally sampled.

Note: If you are on a vessel that must be subsampled, see See Chapter 5, *Fixed Gear Sampling*.

General Instructions for Tally Sampling

1. Determine the amount of gear to tally sample.
   - In general, sets on small boat fixed gear are 100% tally sampled.
2. Collect the equipment needed to tally sample:
   - A clipboard, one to six hand counters, and the Catch Form are needed to tally sample (See Figure 6-8). The tally sample raw data is documented on the back of the Catch Form. The next section will discuss how to document tally samples.
3. Find a location on deck to tally sample.
   - Most likely, only a small location will be available for a tally/sample station on small fixed gear vessels. A tally/sample station should be very near to where the fish comes aboard. From the tally station, observers must be able to clearly identify fish as they come aboard and identify drop-offs and individuals preyed upon. Organize the gear in your tally/sample station by placing the observer scale and length frequency/tape measurer close at hand.
4. Count each species that comes up on the line or in the pot by disposition (retained versus discarded). For species in large quantities, use the hand counters. For other species, make hash marks next to their common name.
   - **Species similar in appearance**: Some species, such as Shortraker and Rougheye rockfish, are similar in appearance and cannot be distinguished unless they are in hand. For these species, tally as a mixed group such as Rougheye/Shortraker or Shortspine/Longspine.

     Tip: These vessels always attempt to get discard over quickly. Be sure all the gear is organized in such a way that the fish can be quickly weighed, measured for length, and returned to the sea.

Tips for Documenting Tally Samples

- The back of the Catch Form is divided into two sections, Retained and Discarded. Write down species names that are likely to be caught down the middle of the form.

  Tip: See examples of how to prepare your forms for tally sampling. (See Figure 6-7.)

- Drop-offs and predation of retained species: While tally sampling, some fish that would have been retained drops off the line or is preyed upon and discarded. These discarded fish, which would have been retained, should be documented in the raw data as such. Be prepared by creating an area on the deck form to document all drop-offs and individuals preyed upon for the retained target species.
- Small individuals of retained species: While tally sampling, some fish that would have been retained are considered too small by the vessel to keep and are discarded. These discarded fish, which would have been retained, should be documented in the raw data as such. Create a space on the back of the Catch Form to document "smalls" of the retained target species.
- Pacific halibut: Generally, Pacific halibut are not caught on small boat fixed gear vessels, at least not in any quantity. Therefore, it may not be necessary to designate an area on the form for PHLB.
- Gear Units: Since the vessel will most likely be pulling multiple units of gear during the set, be prepared to document the gear units as they are brought aboard on your form

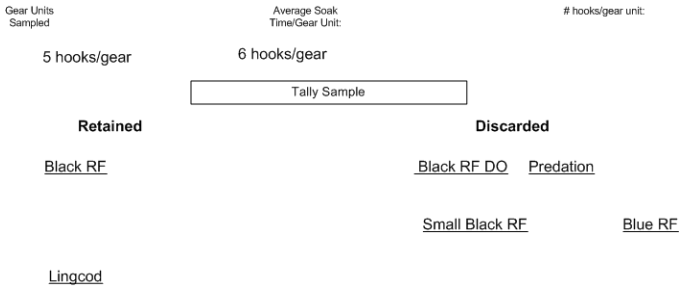


Figure 6-7: Example of raw data sheet.

Collecting Weights

During each set/haul, the observer is responsible for counting each individual that is on the line or in the pot (i.e. tally sampling) and collecting weights for each fish species. There are five methods for determining weights on fixed gear vessels. They are listed below in order of preference:

1. Weigh individuals from within the same set.
2. Use weights collected from another "like" set.
3. Visually estimate weight of individuals.
4. PHLB Length/Weight Conversion (only for Pacific Halibut)

   Tip: Weight estimates for drop-offs and fish affected by predation are based on the average weight for retained individuals of the same species.

5. Fish Ticket Weights (Retained Fish Only)

Weights from individuals within the same set

Since 100% of hooks/pots are tallied, individuals for average weights will be collected while tally sampling.

Tip: Collect, at minimum, 15 individuals from non-target species for average weight calculations. Count and weigh at least 30 individuals from target species.

Species that are known to be retained by the vessel will have some fish that are discarded. Tally sample these separately in the raw data:

Drop-off: Fish that fall off the line as they leave the water line. These individuals do not make it aboard the vessel.

Predation: Fish that have been damaged by whales, sand fleas, hagfish, lingcod or other animals.

Smalls: Fish that are considered by the vessel to be too small and not profitable to keep.

Tip: Fish carcasses or skeletons should not be weighed. These fish are tallied as fish discarded due to predation. Use the average weight derived for the species from whole specimens

Weights from "Like" Sets

There may be one or more species for which it was impossible to collect individuals to use for average weights. This usually happens if only a few individuals of a given species that are caught. If this occurs, use average weights of the same species from a similar set when available.

Tip: Like sets are:

1. Close in proximity
2. Similar in depth range
3. Similar in soak time
4. Targeting the same species

Visually Estimated Weights of Large Organisms and Discarded Catch

When an organism is too large to weigh, a visual estimate is made. Large organisms commonly encountered on small boats include sharks and skates.

For example: Large skates will usually break the gangions when they leave the water. This means the observer will not be able to get a weight for large skates and using an average weight from smaller skates would be biased. Therefore, taking a visual estimate of the weight is the best option.

If a species that would not have been retained drops-off the line, is deteriorated due to predation, or if no individuals of a species is collected for weights on the set or on previous sets, then visually estimate it's weight while tally sampling.

Visual Estimates for Retained Species

If possible, observers should actually weigh retained species or obtain a subsample of retained individuals to determine average weights. However, on some vessels, it may not be possible to weigh retained fish. Because fishers participating in the live fish market are extremely concerned about the condition of their fish, they may not allow the observer to handle live retained catch. Also, physical constraints aboard the vessel may make it impossible to obtain a random sample of unsorted retained catch.

If it is not possible to collect and weigh a sample of retained fish for average weights, visual estimates can be obtained by one of the following methods (in order of preference):

- Record visual estimate of every retained individual as it comes aboard and sum estimates by species.
- For more abundant species, use a systematic sampling strategy (described above) to visually estimate the weight of every nth fish. Determine the average of these visual estimates and multiply by the total number tallied.
- When a retained species is consistent in size, apply a visually estimated average weight to the total tally. With this method, rather than visually estimating the weight of individual fish, the tally is multiplied by an "overall" average weight estimate for that species.

Note: When visual estimates are used for retained species, the same average weights must be applied to fish of the same species that are discarded due to drop-off or predation. These are also recorded as visual estimates.

Pacific Halibut

Pacific halibut are not commonly encountered on most small fixed gear vessels. For specific instructions regarding Pacific halibut, see See Chapter 5, *Fixed Gear Sampling*.

Fish Ticket Weights (Retained Fish Only)

If it is not possible to collect and weigh a sample of retained fish for average weights and visual estimates were not made, delivery weights (fish tickets) can be used to calculate the average weights of retained species. Because fishers participating in the live fish market are extremely concerned about the condition of their fish, collecting samples of retained individuals may not be possible. Visual estimates of fish are preferred over fish ticket weights. When using delivery weights:

1. Tally ALL retained individuals by species by haul.
2. Observe the weighing of the fish by species upon landing, if possible. If not, ask the skipper for a copy or look at the weights on the fish ticket.
3. Calculate average weight of species by:

Calculation

$$\text{Average Species Wt} = \frac{\text{Landing Weight of Species (lbs)}}{\text{\# of Individuals of Species Caught During ENTIRE Trip}}$$

4. For each haul, calculate the weight of retained species.

Calculation

Species Wt by Haul =
(Average Species Wt) x (# of Individuals Caught in Haul)

Random Sampling for Collecting Average Weights

The preferred method for collecting individuals for average weight determinations on small fixed gear vessels is to use a systematic sampling frame with a random start, and to collect individuals throughout the entire set.

Individuals may be collected systematically by one of the following methods:

- Systematically select individuals throughout entire set.
- Weigh all individuals from the systematically selected gear units throughout set.

Systematically Sampling Individuals Through Entire Set

1. Estimate the total number of individuals that will be caught on the set. Ask the skipper if unsure.

Example: 100 kelp greenling

2. Determine the number of individuals that will be collected.

Example: 20

3. Determine the sampling frequency (n) by dividing the estimated number that will be caught by the number of fish that will be collected.

Example: 100 (estimated #)/20 (# wanted) = 5 (n). The sampling frequency is every 5th fish.

4. Randomly select the start point between 1 and n using the random number table or watch.

Example: Use random number table to select a number between 1 and 5 (n). 2 is randomly selected.

5. Collect and weigh randomly selected start fish and every nth fish throughout the set.

Fish weight extrapolation: Determine the total weight of a species when less than 100% are weighed during a set. The average weight per fish is determined and the value is then multiplid by the total number of fish in the tally sample.

Example: Collect the 2nd, 7th (2 + 5(n)), 12, 17.....97th.

Systematic Sampling of Gear Segments Throughout Entire Set

This method works well when a species is caught consistently through the entire set and when the gear can be divided into sampling units, such as sticks, traps, or strings of traps.

1. Define the population.

Example: An estimated 300 cabezon will be caught in a set of traps

2. Sampling frame by gear.

Example: A string of trap gear.

3. Determine the sample unit. Sample unit = individual traps (collect all cabezon in each selected trap), total number of traps or sample units.

Example: Sample units are 150 traps in a string of gear.

4. Number all units

Example: 1 - 150 traps.

5. Determine how many Sampling Units are in the sample.

Example: Assume 300 cabezon are caught in 150 traps, and assume there will be 2 CBZN per trap and a total of 30 CBZN are needed for average weights. (total traps to sample = 30 average weight CBZN / 2 CBZN per trap, ANSWER = 15 traps) 15 traps or sample units to get desired number of fish for average weights. So, 15 pots (sample units) will need to sampled.

6. Divide total traps or units by the number of Sampling Units desired in sample = n.

Example: n=150 units/15 Sampling units = 10, so n is every 10th pot.

7. Randomly select a random number between 1 and n using the random number table or watch.

Example: Use random number table to select a number between 1 and 10 (n). 9 is randomly selected.

8. Collect and weigh the fish in the randomly selected gear segment and every nth gear segment throughout the set.

Example: Collect fish from the 9th, 19th (9 + 10(n)), 29th.....

Documenting Tally Samples

The tally sample is normally documented on the back of the Catch Form (see Figure 6-9), along with the weights of individuals of each species weighed. Once sampling for the haul is complete, the Catch Form and Species Composition Forms can be completed.

Catch Categories on Fixed Gear Vessels

As a review, there are two rules that apply to catch categories:

- Retained and discarded individuals are always in separate catch categories.
- Individuals are grouped in the same catch category when they are sampled together. All individuals in the grouping must have the same weight method, hook counts and sample method.

Grouping, Assigning Weight Methods, and Naming Catch Categories on Fixed Gear Vessels

On fixed gear vessels, catch category grouping depends upon the method used to obtain the weight of the species (actual weight, visual estimate, fish ticket, etc.).

1. All species whose weight was determined by an actual

weight from the same set or from "like" sets, should be grouped in the same catch category by disposition (retained and discarded). On the Catch Form, these catch categories will have Weight Method 13 - Tally Sample.

- As these catch categories will have a species composition sample, the name of the catch category is irrelevant. ZMIS is most commonly used.

2. Species whose weight was determined by a visual estimate should be placed in their own catch categories. On the Catch Form, these catch categories will have Weight Method 14 - Visual Experience.
   - As these catch categories will not have a species composition sample, the most descriptive catch category code possible should be used. To determine catch category code, in order of preference, use:
     - Species specific code (i.e. ARRA, Aurora rockfish)
     - Species grouping code (i.e. NSLP, North Slope Rockfish)
     - INVT: invertebrate discard.
     - MBOT: miscellaneous bottom items, including rocks, mud, logs, bones, garbage, etc.
     - ZMIS: Mixed catch which can include fish species, invertebrates, and bottom items (like rocks, logs, etc.). For unsampled catch categories, ZMIS should only be used when a more specific name is not available.

3. Pacific halibut whose weight is determined using the length-to-weight table should be placed in it's own catch category, by disposition. The catch category weight method on the Catch Form will be WM-9 P. Halibut Length/Weight Conversion or 19 - P. Halibut Length/ Weight Extrapolation. These weight methods are used when lengths are visually estimated OR actually measured and the weights are calculated in the database using the IPHC Pacific halibut Length/ Weight conversion table.
   - As these catch categories will not have a species composition sample, the most descriptive catch category code, PHLB, should be used.
     - The visually estimated lengths will be documented on the Length Frequency form using sample method 10 -P. Halibut visual length estimate. The actual lengths taken will be documented on the Biospecimen form.

4. All retained species whose weight was determined by fish ticket weights should be grouped in a single catch category. On the Catch Form, these catch categories will have Weight Method 13 - Tally Sample.
   - As these catch categories will have a species composition sample, the name of the catch category is irrelevant. ZMIS is most commonly used.

Based upon these rules, complete the Catch Form, as much as possible

Catch Form Instructions

The Catch Form (See Figure 6-8) is used to document catch categories, sample weights, and other catch information. A Catch Form should be completed for all hauls.

> **Tip**: The "Catch/ Sample Weight" column on the Catch Form is filled out differently for fixed gear and trawl vessels. For fixed gear, the weights recorded are sample weights; for trawl, the weights represent total weight estimates for the catch category.

- **Haul #**: Record the number of the haul.

- **Page _ of _**: Number forms sequentially with in each haul. Haul forms (Catch, Species Composition, Length Frequency, and Biospecimen) are numbered consecutively, separate from Trip forms.
- **Date**: Record the date as MM/DD/YY.
- **Trip Number**: This number is automatically generated by the database. Complete this field once the trip has been started in the database.
- **Visual OTC:** This is used on trawl vessels only. For fixed gear vessels, leave this field blank.
- **Catch #**: Number the catch categories consecutively, starting from 1 for each haul. The numbers on the paper Catch Form must match the numbers assigned by the database when data is entered.
- **R or D**: Record whether the catch category is R – Retained or D – Discarded.
- **Catch Category**: Record each catch category, in capital letters, using the 3 or 4-letter PacFin code. For a list of PacFin catch category codes, see Appendix F.
- **Catch/ Sample Weight**: Record the sample weight of the tally sample in pounds.

  Tip: If there is a species composition sample for the catch category, the Sample Weight should be the same as the Keypunch Weight on the Species Composition Form! (If not, there is a problem.)
- **Volume:** Leave this field blank on fixed gear vessels.
- **Density:** Leave this field blank on fixed gear vessels.
- **Fish #**: The total number of fish in the catch category must be documented for the following weight methods: 14 - Visual Experience (if actual number) and 9 - P. Halibut Length/Weight conversion.

  Tip: Do not record the number of fish for weight method 13 - Tally Sample; these are recorded on the species composition form.

  Tip: Weight method 8 is not used in fixed gear data.
- **Hooks/Pots Sampled by Catch Category**: Record the number of hooks or pots that were tally sampled.
- **Wt. Method**: Document the weight method used to estimate the sample weight for each catch category.

  6 Other
  9 Pacific halibut length/weight conversion
  13 Tally sample
  14 Visual experience

- **Catch Purity:** If catch category was sampled for species composition, record M- Mixed if more than one species was within sample. Record P - Pure if there was only one species in species composition sample.

  If the catch category was not sampled, record as P – Pure if the catch category is composed of 95% or greater a single species or as M – Mixed if the catch category is composed of less than 95% a single species.
- **Discard Reason**: Record the skipper/crew's discard reason for discarded catch categories for Weight Method 9 - PHLB Length/Weight Conversion and Weight Method 14 - Visual Experience. Whenever a catch category does not have an associated species composition sample, discard reason must be documented on the catch form.

  11 Incidental/Accidental
  12 Drop-off
  13 Market
  14 Other
  15 Predation
  16 Regulation
  17 Safety
  18 Market (dockside only)
  19 Utilized on board

  Tip: Look only at the primary reason for discard. For

instance, if the vessel is not retaining P. hake and one drops-off, do not record the reason for discard as drop-off. Even if it had made it on the vessel, the fish would not have been retained. This also applies to fish preyed upon that drop-off. If a fish that would have been retained drops off because it's been preyed upon, the reason for discard should be predation (even if the fish made it aboard it would not have been retained due to predation)

- **Comments**: Document anything important about each catch category. Species names should be recorded here if catch category is not accompanied by a species composition sample and catch category name does not indicate species. For example: INVT, MBOT and OSRK.
- **Keypunch checks:** These are required fields for Catch/ Sample Weight, # of Fish, and # of Hooks/ Pots sampled by catch category columns. Sum up the entries in each column and place the total in the corresponding keypunch box at the bottom of the form.

Haul # ☐☐ **CATCH FORM*** Page ____ of ____

Date ☐☐☐☐☐☐ Trip Number ☐☐☐☐☐ Visual OTC _____

Catch #	R or D	Catch Category	Catch/Sample Weight	Volume	Density	Fish # Req. for WMs 8,9,19 & 14 (if actual)	# Hooks/Pots sampled by catch category	Wt Method	Catch Purity	Discard Reason	Comments
Keypunch Check											

*Combined form for all gear types

Combined Catch Form v.1 September 2013 OMB Control No. 0648-0593 expires 11/30/2015

Figure 6-8: Catch Form

Back of the Catch Form Instructions

The back of the Catch Form (See Figure 6-9) is used for organization of fixed gear raw data.

- **Haul Locations Table:** Optional fields. This table is helpful when the observer must obtain locations on his/ her own.
- **Additional locations:** Optional fields. Additional locations can be obtained to provide a better description of fishing area on vessels using gear that is not defined by buoy to buoy.
- **Gear Units Set:** Record the # of gear units set for gear type 19 or the # of gear units (individual hooks or pots) for other gear types.
- **Gear Units Sampled:** Record the number of segments or units that were tally sampled.
- **Gear Units Lost:** Record the number of gear segments or units that were lost.
- **Fit Number/Calibration Weight:** Record the Fit number from your marine calibration followed by the displayed weight of your 5KG test weight in pounds on every haul. This field will not be entered into the database.
- **Average Soak Time:** Optional field. If set was not defined by buoy to buoy and gear type is not pole (e.g. Vertical Longline or individual Sablefish Traps, not on a string), document the average range of soak time of a single unit of gear. (Gear types 7 and 9 always; Gear types 10 sometimes (if pots are attached to a groundline); Not used for gear types 19 and 20 (defined buoy to buoy)
    - < 1 minute
    - 1 to 5 minutes
    - 5 to 15 minutes
    - 15 to 30 minutes
    - 30 to 45 minutes
    - 45 to 60 minutes
    - 60+ minutes
    - 1-2 hours
    - 6 hours
    - 12 hours
    - 24 hours
    - 36+ hours
- **Retained and Discarded Tally Sample Area**: This is where fixed gear raw data is recorded. Tally and fish weights will be recorded here. This raw data will be sub totaled by species and recorded on the species composition form.
- **Biospecimen Table:** This table should be used to complete a biospecimen form, but will not be directly entered into the database.

				Latitude		Longitude		
Set #		Date	Time	Degrees	Minutes	Degrees	Minutes	Depth (fm)
	Start							
	End							
Additional Locations								

Gear Units Set: _____ Gear Units Sampled: _____ Gear Units Lost: _____

Tally Sample

Fit # / Cal. Wt. _____ Avg. Soak Time _____

Retained | **Discarded**

Species:		Species:		Species:		Species:		Species:	
Length	Bios / Freq.	Length	Bios / Freq.	Length	Bios / Freq.	Length	Bios / Freq.	Length	Bios / Freq.

Figure 6-9: Back of the Catch Form

Completing the Species Composition Form

In order to complete the Species Composition Form, the total weight of each species in the tally sample needs to be determined. Average weight calculation will need to be done for species whose weight was determined by:

1. A random subsample of all individuals caught were weighed (all individuals of species not weighed).
2. Fish ticket weights use for retained species AND trip had more than one haul.

Note: It is preferable to get independent visual estimates of retained fish if you cannot get actual weights rather than use Fish Ticket weights. Fish ticket weights are already available for us to use so an independent observer estimate is preferred.

Average Weight Calculations

For species that all the individuals in the tally sample were not weighed, an average weight calculation is used to calculate the sample weight of the species. To determine sample weight:

1. Weigh and count randomly selected individuals by species.
2. Divide the weight of individuals weighed by the number of individuals weighed and then multiply by the total number of individuals of that species in tally sample.

Calculation

$$\text{Total Sample Wt} = \frac{\text{Wt of Subsample}}{\text{\# in subsample}} \times \text{Total \# in Tally Sample}$$

Using Delivery Weights for Average Weights of Tallied Individuals

Refer to "Fixed Gear Complications" section of this chapter for information on using delivery weights for retained species.

Sample Methods on Fixed Gear Vessels

There are three sample methods that describe species composition sampling on fixed gear vessels. Remember, only catch categories with weight method 13 - Tally sample will have species composition samples.

Sample Method 4 – Fixed Gear Sample

Used for species whose weight is determined by weights from individuals in the same set or in "like" sets.

> **Tip**: It is not necessary to place a species whose weight is extrapolated in a different catch category than species where each individual was weighed. They should ALWAYS be in the same catch category
>
> **Tip**: If an average weight from like "set(s)" is used, be sure to document in raw data the haul number(s) that were used

Sample Method 5 - Fixed Gear Fish Ticket Verified

Used for species whose weight is determined by using the fish ticket (landing receipt) weight AND when the observer has "verified" that the weight on the fish ticket represents the number of individuals per species in the retained tally sample. For a fish ticket weight to be considered verified, the observer must monitor the landing and be 100% confident that all fish in the tally sample are weighed at landing.

Sample Method 6 - Fixed Gear Fish Ticket Unverified

Used for species whose weight is determined by using the fish ticket (landing receipt) weight AND when the observer was not able to see the landing or is not confident all individuals in the tally sample were included in the fish ticket weight.

Release Methods (Nearshore Fisheries Only)

Fishers in the nearshore fisheries may use special techniques to increase the probability of survival of discarded rockfish species. Document, on a species level, the most common method used to release nearshore rockfish species. Leave blank if unsure and for all non-rockfish species.

Note: Document the "normal" release method of the vessel. If method being used by observer is different than the vessel's normal release method, be sure to document what the vessel normally does without observer presence!

- **Thrown directly over (TO)**: Rockfish species is generally thrown directly back to sea, without venting or other release method.
- **Mostly Vented (MV)**: Rockfish species is normally vented by the crew prior to release back to sea.
- **Mostly Released at depth by cage (DC)**: Rockfish species is placed in a cage and released at depth.
- **Mostly Released at depth by weighted line (DW)**: Rockfish species is placed on a weighted line and released at depth.
- **Mostly Released at depth by other method (DO)**: Rockfish species is released at depth by a different method. Describe method in observer logbook.
- **Other Method of Release (OM)**: Rockfish species is carefully released using a different method. Describe method in observer logbook.
- **Not Collected (NC)**: Rockfish release method was not collected. Typically used when fish drop off the line.

Species Composition Form Instructions

Species composition information is recorded on the Species Composition Form (See Figure 6-10).

- **Haul Number**: Record the number of the haul that the sample came from.
- **Page _ of _**: Number forms sequentially with in each haul. Haul forms (Catch, Species Composition, Length Frequency, and Biospecimen) are numbered consecutively, separate from Trip forms.
- **Date**: Record the date as MM/DD/YY.
- **Trip #**: This number is automatically generated by the database. Complete this field once the trip has been started in the database.
- **Fit #/Calibration weight**: If these data were documented on the back of the Catch Form, leave this field blank. Record the Fit number from your marine calibration followed by the displayed weight of your 5KG test weight in pounds on every haul. This field will not be entered into the database
- **Trawl Biosampling List**: Leave this field blank on fixed gear vessels. The same list, either Nearshore or Non-Nearshore Fixed Gear, will be used for all hauls.
- **Catch #**: Record the number that corresponds to the catch category on the Catch Form.
- **Catch Category**: Record each catch category, in capital letters, using the 3 or 4-letter PacFin code. For a list of PacFin catch category codes, see Appendix F.
- **Sample Method**: Record the method used to sample the catch category.

4 Fixed gear

5 Fixed gear - fish ticket verified

6 Fixed gear - fish ticket unverified

- **Species**: Record the common name of each species in the sample. This column must be filled in with the species name. Do not simply enter the species code! The common name listed on the paperwork must match the common name used in the database. Species specific PacFin codes are acceptable (e.g. DSRK, ARTH).
- **Species Code**: Record the species code of the corresponding species. It is not necessary to complete this field while on deck. For a list of all species codes see Appendix A-E.
- **Sample Weight:** Record the total weight of the species in the sample (can be extrapolated).
- **Fish Number:** Record the number of fish of each species in the sample (can NOT be extrapolated).
- **Discard Reason**: Record the skipper's/crew's reason for discard for each discarded species (refer to Chapter 3, *Observer Basics* for more information on these codes.

11 Incidental/Accidental
12 Drop-off
13 Market
14 Other
15 Predation
16 Regulation
17 Safety
18 Market (dockside only)
19 Utilized on board

Tip: Look only at the primary reason for discard. For instance, if the vessel is not retaining P. Hake and one drops-off, do not record the reason for discard as drop-off. Even if it had made it on the vessel, the fish would not have been retained. This also applies to fish preyed upon that also drop-off. If a fish that would have been retained drops off because it's been preyed upon, the reason for discard should be predation (even if the fish made it aboard it would not have been retained due to predation)

- **Release Method:** Document the two letter code that corresponds the release method used for rockfish species in the nearshore fishery.

TO Thrown directly over
MV Mostly vented
DC Mostly released at depth by cage
DW Mostly released at depth by weighted line
DO Mostly released at depth by other method
OM Other method of release
NC Not collected

- **Basket Weight and #**: Use these columns on deck to document numbers and weights. These columns are not commonly used for fixed gear data. Tally sample raw data is usually recorded on the back of the Catch Form. Raw data from back of Catch Form should not be transcribed to these columns.

Once the Species Composition Form is completed, fill in the "Sample Weight" column on the Catch Form with the "Keypunch Weight" for those catch categories with weight method 13.

Haul # ☐☐

SPECIES COMPOSITION FORM

Page ____ of ____

Date ☐☐☐☐☐☐ Trip # ☐☐☐☐☐ Fit # / Cal. Wt. _____

Trawl Biosampling List
1 2 3

Catch #	Catch Category	Sample Method	KP Weight / KP Number	Species	Species Code	Sample Weight	Fish #	Discard Reason	Release method	Basket Weight	#	Basket Weight	#

Trawl Sample Methods
1 – Whole haul
2 – Single basket
3 – Multiple basket

Fixed Gear Sample Methods
4 - FG Sample
5 - FG(Verified Fish Ticket)
6 - FG(Unverified Fish Ticket)

Reasons for Discard
11-Incidental/Accidental 12-Drop off 13-Market
14-Other 15-Predation 16-Regulation 17-Safety
18-Market (Dockside) 19-Utilized on board

Release Methods for RF (Nearshore Fisheries Only)
TO-Tossed over **MV**-Mostly Vented **DC**-Mostly released at depth by cage **DW**-Mostly released at depth weighted line **DO**-Mostly released at depth other method **OM**-Other release method used **NC**-Not Collected

Species Composition Form
October 2013

OMB Control No. 0648-0593
Expires 11-30-2015

Figure 6-10: Species Composition Form

Determining OTC on Fixed Gear Vessels

The following weight methods are to be used to calculate OTC on fixed gear vessels.

Weight Method 6 - Other

There are two situations where weight method 6 - Other is used on fixed gear vessels:

- Hauls not sampled/Entire set lost
- Hauls were the number of hooks sampled is not consistent for all catch categories.

Weight Method 8 - Extrapolation

This method is used when less than 100% of the gear is tally sampled. All Catch Categories must have the same number of sampled gear units

Calculation

$$\text{OTC} = \frac{(\sum \text{All Catch category weights on Catch Form}) \times (\text{Total \# of Hooks in Set})}{\text{Number of hooks sampled}}$$

Note: When GEAR IS LOST, Weight Method 8 - Extrapolation must be documented for the OTC weight method, gear performance must be 5 - other gear lost, and # gear units/ segments lost must be completed in order to account for the unsampled (lost) gear. An extrapolation for lost gear is made when a gear segment, such as a stick or trap is lost, but NOT when individual hooks break off.

Weight Method 11 – Retained + Discarded

This method is used when 100% of the gear is tally sampled. The total # of gear segment units will equal the # of gear segments/units sampled.

Calculation

$$\text{OTC} = \Sigma \text{All Catch Categories on Catch Form}$$

Recording Fishing Effort Information

Fishing effort information must be recorded for every set a vessel makes while the observer is on board. The fishing effort information is recorded on the Trip Form, which is separated into two sections (See Figure 6-13 and Figure 6-15).

Seabird Avoidance Gear

Vessels that fish with hook and line gear often have seabirds following the vessel, attacking hooks as they are set. In order to prevent bait from being stolen and birds from dying, some vessels use a seabird avoidance device while setting their gear.

WCGOP seabird avoidance gear codes are:

0	No
2	Streamer line(s)
3	Buoy line
4	Weights
5	Night setting (exclusively)
6	Other (describe in haul comments)

Common types of seabird avoidance gear include:

2-Streamer/Tory Lines (Single and Paired): Streamer/tory lines consist of a length of line, streamers (smaller pieces of line) attached along a portion of the length, and one or more floats at the terminal end. Paired streamer lines consist of two streamer lines, one deployed on each side of the main groundline.

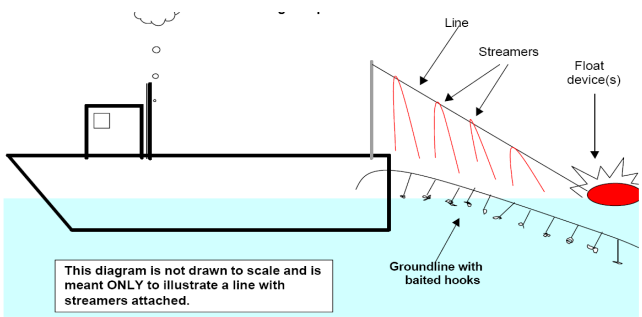


Figure 6-11: Streamer Line Diagram

*3 - **Buoy Bag Line:*** A buoy bag line consists of a length of line (no streamers attached) and one or more float devices at the terminal end.

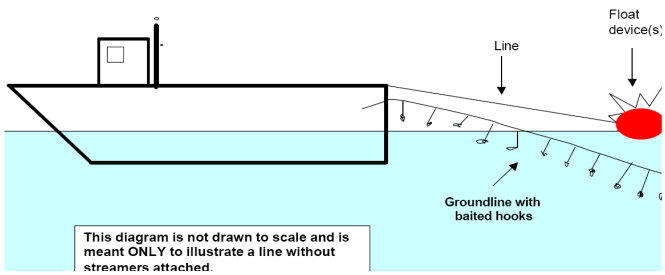


Figure 6-12: Buoy Line Diagram

*4 - **Weights:*** Crew adds extra weights to the groundline for the purpose of sinking gear more quickly.

*5 - **Night Setting (Exclusively):*** The vessel sets at night to avoid seabird bycatch.

*6 - **Other:*** Vessel uses a different method to avoid/reduce seabird bycatch. Describe method used in observer logbook and in haul comments.

Trip Form Instructions

A Trip Form must be completed for all trips. (See Figure 6-13)

- **Fishery Sector** (along top right hand border): Circle the fishery type the vessel participated in. (CS = Catch Share, LE = Limited Entry, OA = Open Access, or **EFP** = Exempted/Experimental Fishing Permit).
- **Page #**: All Trip Forms are numbered together by trip and separate from all other forms. If there are five trip forms on one trip, number them 1 of 5 through 5 of 5.
- **Trip #**: This number is automatically generated by the database. Complete this field once the trip has been started in the database.
- **USCG #**: Record the six or seven digit USCG vessel number posted on the exterior of the vessel or found in the database. You can also request this from the vessel skipper. ***If the vessel does not have a USCG number, leave field blank and fill in the State Registration Number field.***
- **State Registration #**: Use this field only if the vessel does not have a USCG number. The state registration number will begin with a CF in California, OR in Oregon, and WN in Washington.
- **Observer Name**: Record your first and last name.
- **Year**: Fill in with appropriate year.
- **Vessel Name**: Record the full name of the vessel as it appears on the vessel and/ or in the database. For example, record Capt John, not Captain John.
- **Partial Trip:** Check the box if the trip included more days than were observed. (Fish ticket includes unobserved catch.).
- **Total # of Fishing Days (KNOWN)**: Document the total number of days the vessel fished before landing. **This field is only completed when the trip is a partial trip.**

Seabird avoidance gear: Only record the gear if it's intentionally being used to avoid catching birds and not just incidentally because the vessel always sets gear at night.

EFP: Permits that allow fishing activities that would otherwise be prohibited. The permits are usually written by the state and must pass a vote by the PFMC.

- **Fishery**: Record the name of the fishery the vessel was selected for:

  Limited Entry Sablefish

  Limited Entry Zero Tier

  CA Nearshore

  OR Blue/Black Rockfish Nearshore

  OR Blue/Black Rockfish

  WC Open Access Fixed Gear

- **Vessel logbook name**: Record the name of the logbook the vessel is using to record fishing effort information. The following logbook can be used:

Fishery	Vessel Logbook Name
Limited Entry Sablefish	No logbook required, however, if vessel is recording information in a logbook, document the logbook's name. If logbook name is not available in the database, contact the Database Manager.
Limited Entry Zero Tier	No logbook required, however, if vessel is recording information in a logbook, document the logbook's name. If logbook name is not available in the database, contact the Database Manager.
CA Nearshore	No logbook required, however, if vessel is recording information in a logbook, document the logbook's name. If logbook name is not available in the database, contact the Database Manager.
OR Black/Blue Rockfish and OR Black/Blue Rockfish Nearshore	OR Nearshore
WC OA Fixed Gear	OR Fixed Gear (Oregon vessels only)
California and Washington do not require logbooks. However, if vessel is recording information in a logbook, document the logbook's name. If logbook name is not available in the database, contact the Database Manager.	

- **Permit/ License #**: Document, the permit number being used. All fixed gear fisheries, with the exception of WC Open Access Fixed Gear, must have a permit or license number documented. Limited Entry Sablefish vessels can have up to three permits stacked. All permit numbers associated with the vessel must be documented. Vessels use at least one groundfish permit number which start with GF, in capital letters, and is followed by 4 digits, all with no spaces. For example: GF0432. Permit numbers should be acquired by asking the captain of the vessel or can be looked up at: http://www.nwr.noaa.gov/Groundfish-Halibut/Groundfish-Permits/index.cfm

- **Vessel Logbook #**: The Vessel Logbook number is the page number(s) where the skipper is recording the trip information. Do not record the number of the entire Logbook! If multiple page numbers were used during a trip, enter only the first page number into the database field. Enter additional page numbers into the trip notes section of the database.

- **First Receiver** (Catch Share Only): This field is only used in the Catch Share program**.** Leave blank

- .**Observer Logbook #**: Record the number on the front page of the Observer Logbook used to document information about the trip.

- **Skipper's Name**: Record the first and last name of the skipper. If your skipper is not in the database, contact your debriefer to have it added.

- **# of crew** (including captain): Document the number of crew on the vessel. This should include the skipper, but not yourself.

- **Departure Date/Time**: Document the date and time the vessel left port. Date must be documented as MM/DD/YYYY. Time must be documented using military time (e.g. 1400).

- **Landing Date/Time**: Document the date and time the vessel returns to port. Date must be documented as MM/DD/YYYY. Time must be documented using military time (e.g. 1400).
- **Departure Port**: Document the port the vessel departs from.
- **Landing Port**: Document the port the vessel returns to.
- **Fish Ticket Number(s)**: Obtain the numbers of all landing receipts (fish tickets) from the vessel skipper, the port biologist, or the fish plant. **This is a required field for all fisheries and trips with retained fish**!
  - CA fish tickets begin with a letter followed by six digits.
  - OR fish tickets are seven digits.
  - WA fish tickets begin with two letters followed by six digits.
- **WOC**: The state agency code is: C - for California deliveries, O - for Oregon deliveries, or W - for Washington deliveries.

  Tip: always confirm that you have received all fish ticket information for each trip. Plants often record landings from a single trip on more than one fish ticket.
- **Date**: Document the date in MM/DD/YY that is recorded on the fish ticket.

Haul Information Instructions

- **Haul/Set #**: Number sets consecutively, starting with 1 for each trip.

  Tip: Hauls must be numbered in the order retrieved! If hauls are numbered in the order they were set, all Catch, Species Composition, and Trip Information will need to be renumbered at debriefing
- **Observer Total Catch Estimate** (OTC): Record the total catch estimate to two decimal places. Observer Total Catch estimate is recorded in pounds.
- **Weight Method**: Enter the number that represents the weight method used to obtain the observer total catch estimate. The weight methods that may be used for fixed gear OTC's are:

  6 Other
  8 Extrapolation
  11 Retained + Discard

- **Gear Performance**: Record one of the following codes to document gear performance:

  1 No problem
  2 Pot was in haul
  3 Net hung up
  4 Net ripped
  5 Trawl net or codend lost, pot(s) lost, other gear lost
  7 Other problem. Document other gear-related problem(s) in the comments section.

  Tip: If line parts but all gear is retrieved, use 1- No Problem and put a note in comments
- **Total Hooks/Pots Set**: Record the total number of hooks or pots in the set. This number should include lost gear.

  Tip: Use Weight Method 8-extrapolation when gear is lost or less than 100% is tallied; use weight method 11-Retained + Discard when 100% of the gear is tallied.
- **# of Hooks/Pots Lost:** Record the total number of pots that were lost during the set, or the number of hooks lost (rounding to the nearest whole number). Do not record individual lost hooks, only sections of gear with multiple hooks.
- **Seabird Avoidance:** (Gear types 7, 9, 19, & 20 only): Document the number that describes the type of seabird avoidance gear used or document "0" (No) if not used. Note: only document gear that was used

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Q: Why do observers record logbook page numbers?

A: The fishing locations of vessels carrying observers are compared to the fishing locations of vessels not carrying observers to ensure vessel activity has not changed with the observers on board.

Q: Why do observers record fish ticket numbers?

A: When observer data is analyzed, the total landed weight from the fish ticket is used to estimate the amount of discard by species per landed weight of target(s).

specifically to prevent bait from being stolen and birds from dying.

0 No
2 Streamer line(s)
3 Buoy line
4 Weights
5 Night setting (exclusively)
6 Other (describe in haul comments)

- **Avg. Soak Time:** If set was not defined by buoy to buoy and gear type is not pole, document the average range of soak time of a single unit of gear. (Gear types 7 and 9; Gear type 10 sometimes (if pots are not attached to a groundline); Not used for gear types 19 and 20 (defined by bouy to bouy)).

  < 1 minute
  1 to 5 minutes
  5 to 15 minutes
  15 to 30 minutes
  30 to 45 minutes
  45 to 60 minutes
  60+ minutes
  1-2 hours
  6 hours
  12 hours
  24 hours
  36+ hours

- **Comments**: Document any important information about the haul that is not adequately conveyed by the other fields. This should include notes on any hauls with gear performance 7-other.
- **OTC Keypunch Check**: Sum the OTC's for an entire trip and record total weight of trip in OTC keypunch check box. (If more than one Trip Form is used, sum total catch estimates of **all** hauls to obtain keypunch check.)
- **Total Hooks/Pots Keypunch Check:** Sum all of the hooks/pots counts for an entire trip and record total hooks/pots count of trip in this column. (If there are multiple Trip Forms, add total hooks/pots counts of all hauls to obtain keypunch check.)

Trip Information

Page ___ of ___

Trip # ☐☐☐☐☐ USCG # ☐☐☐☐☐☐☐ or State Reg # ☐☐☐☐☐☐☐☐

Observer Name _____ Year 2 0 1 ☐

Vessel Name _____ Partial Trip ☐ (NCS only) Total # of Fishing Days (KNOWN) ☐

Fishery _____ Vessel Logbook Name _____

Permit/License # _____ Vessel Logbook Page # _____

First Receiver (CS only) _____ Observer Logbook # _____

Skipper's Name _____ # of Crew (including captain, not including observer) _____

Departure Date/Time ___/___/___ _____ Departure Port _____

Landing Date/Time ___/___/___ _____ Landing Port _____

CS LE OA _EFP

Fish Ticket #	WOC	Date	Fish Ticket #	WOC	Date

Haul Information

Haul/ Set #	OTC Estimate	Weight Method	Gear Perf	Total Hooks/ Pots Set	# of Hooks/ Pots Lost	Seabird Avoidance (Gears 7, 9, 19, & 20)	Avg. Soak Time m = minutes, h =hours	Comments
							< 1m 1-5m 5-15m 15-30m 30-45m 45-60m 1-2h 2-6h 6-12h 12-24h 24-36h 36+h	
							< 1m 1-5m 5-15m 15-30m 30-45m 45-60m 1-2h 2-6h 6-12h 12-24h 24-36h 36+h	
							< 1m 1-5m 5-15m 15-30m 30-45m 45-60m 1-2h 2-6h 6-12h 12-24h 24-36h 36+h	
							< 1m 1-5m 5-15m 15-30m 30-45m 45-60m 1-2h 2-6h 6-12h 12-24h 24-36h 36+h	
							< 1m 1-5m 5-15m 15-30m 30-45m 45-60m 1-2h 2-6h 6-12h 12-24h 24-36h 36+h	
							< 1m 1-5m 5-15m 15-30m 30-45m 45-60m 1-2h 2-6h 6-12h 12-24h 24-36h 36+h	
							< 1m 1-5m 5-15m 15-30m 30-45m 45-60m 1-2h 2-6h 6-12h 12-24h 24-36h 36+h	
							< 1m 1-5m 5-15m 15-30m 30-45m 45-60m 1-2h 2-6h 6-12h 12-24h 24-36h 36+h	
							< 1m 1-5m 5-15m 15-30m 30-45m 45-60m 1-2h 2-6h 6-12h 12-24h 24-36h 36+h	
							< 1m 1-5m 5-15m 15-30m 30-45m 45-60m 1-2h 2-6h 6-12h 12-24h 24-36h 36+h	
							< 1m 1-5m 5-15m 15-30m 30-45m 45-60m 1-2h 2-6h 6-12h 12-24h 24-36h 36+h	
							< 1m 1-5m 5-15m 15-30m 30-45m 45-60m 1-2h 2-6h 6-12h 12-24h 24-36h 36+h	
KP Checks					**Gear Performance**: 1- No Problem, 2- Pot in Haul, 3- Net hung up, 4- Net ripped, 5- Net, pot(s) or other gear lost, 7- Other **Seabird Avoidance:** 0- No, 2- Streamer Line(s), 3- Buoy Line, 4- Weights, 5- Night Setting (Exclusively), 6- Other			

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Figure 6-13: Trip Form

Trip Form – Haul Locations

Tip: Fixed gear vessels are not required to use a logbook so observers are often required to record haul location information on their own.

- **Trip Notes**: Document any information pertinent to understanding the trip. For Catch Share trips document additional First Receivers.
- **Haul/Set Number**: Number hauls consecutively, starting with 1 for each trip.
- **Start Date**: Document the date the haul was set as MM/DD.
- **End Date**: Document the date the haul was retrieved as MM/DD.
- **Start Time**: Document the Pacific Standard Time (PST) when the first hook or pot was put into the water for the start time.

  Tip: Fixed gear can be set prior to the beginning of the trip. Record start time when the gear was set, not the start of retrieval.

- **End Time**: Document the time when the last hook or pot is brought on board during retrieval

  Tip: When additional positions and depths are recorded, they are noted in the lines below the start and end times for the corresponding haul. The times entered in the additional lines should fall between the start and end times, which are entered in the first two rows for the haul.

- **Start and End Latitude**: Document the latitude (in degrees, minutes, 1/100th of a minute) that the haul was set and retrieved.
- **Start and End Longitude**: Document the longitude (in degrees, minutes, 1/100th of a minute) that the haul was set and retrieved.

  Tip: When an observer boards a vessel that has a GPS, check to be sure that it is recording in degrees, minutes, 1/100th of a minute. If it's not, ask the captain to change the view to 1/100th of a minute instead of seconds. (See Figure 6-14)

Figure 6-14: GPS Showing Latitude and Longitude

- **Depth**: Document the fishing depth in fathoms.
- **Gear Type**: Enter a code for the gear type based on the configuration of the gear, and how it is being fished. (Example: If the vessel is using a fishing pole while under way (trolling), the gear type would be recorded as 15 - All Troll Gear.)

  7 Vertical hook and line
  8 Pole
  9 Other hook and line gear
  10 Fish pot
  15 All troll gear
  16 All other miscellaneous gear
  19 Longline (fixed hooks)
  20 Longline (snap-on hooks)

If the fishing vessel is not using one of the above gear types, this is most likely the wrong section of the manual.

Fathom: 1 fathom = 6 feet

- **Excluder Presence:** Leave blank for fixed gear vessels.
- **Target strategy**: Enter the vessel's target strategy. See the Catch Categories List. Only one target strategy may be documented. If the vessel documents more than one target strategy, use the species or grouping that is most prevalent in the haul.

Trip Notes:

Gear Type Codes:
1-Trawl; small footrope (<8 inches)
2-Trawl; large footrope (>8 inches)
3-Midwater trawl
4-Danish/Scottish Seine
5-Other trawl gear,
7-Vertical Hook and Line
8-Pole (Commercial)
9-Other Hook and Line
10-Fish Pot
12-Shrimp trawl single rigged
13-Shrimp trawl double rigged
14-All net gear except trawl
15-All Troll gear
16-All other Miscellaneous gear
17-OR set back flatfish net (pineapple net)
19-Longline (fixed hooks)
20-Longline (snap-on hooks)

Excluder Presence Codes:
1 - Present
2 - Absent
Leave field blank if not collected

TRIP FORM - HAUL LOCATIONS

Haul/ Set #		Date		Time	Latitude		Longitude		Depth of Catch (fathoms)	Gear Type	Excluder Presence	Target Strategy
		Month	Day		Degrees	Minutes	Degrees	Minutes				
	Start					.		.				
	End					.		.				
	Start					.		.				
	End					.		.				
	Start					.		.				
	End					.		.				
	Start					.		.				
	End					.		.				
	Start					.		.				
	End					.		.				
	Start					.		.				
	End					.		.				
	Start					.		.				
	End					.		.				
	Start					.		.				
	End					.		.				
	Start					.		.				
	End					.		.				
	Start					.		.				
	End					.		.				
	Start					.		.				
	End					.		.				
	Start					.		.				
	End					.		.				

Figure 6-15: Trip Form – Hauls Location

Fixed Gear Complications

There are several complications that can occur during the sampling of fixed gear. For most cases, observers should discuss complications with their debriefer. This section will address known issues.

Unsampled Sets

For sets that are not sampled,

- **Trip Form:**
  - Leave the OTC column blank, and document weight method 6-other.
  - Document total hooks/pots set.
  - Document gear performance must **not** be code 5 - Gear lost.
  - It should be noted in the Haul Comments that the set was not sampled.
- **Catch Form**
  - No data required.
- Document what happened thoroughly in the logbook.

Tip: Never use the vessel's estimate for OTC on a fixed gear vessel.

Lost Sets

Occasionally, vessels lose an **entire set**. If this happens record the following on the forms:

- **Trip Form:**
  - Record the fishing effort information the same as with any other set except use the Landing date and time from the Trip Form as the haul end time. Copy the set latitude, longitude and depth. Keep in mind that hauls are numbered in the order they are retrieved, so lost sets will be your last set for the trip
  - Leave the OTC column blank on the Trip Form, and document weight method 6-other.
  - Document gear performance code 5 - Gear lost.
  - Document Total Hooks/ Pots Set.
  - # Hooks/ Pots lost should equal Total Hooks/ Pots Set.
- **Catch Form**
  - No data required.
- Document what happened thoroughly in the logbook.

Occasionally, vessels lose a **part of a set**. They may loose hook or skates due to entanglement of gear. If this happens record the following on the forms:

- **Trip form**:
  - OTC must not be blank. Use weight method 8-Extrapolation.
  - Document gear performance code 5 - Gear lost.
  - Document Total Hooks/ Pots Set.
  - Document amount of gear lost in # Hooks/ Pots Lost.
- **Catch form**:
  - # of Hooks/Pots sampled by catch category should not include the lost hooks or pots.

Tip: OTC does not have to be extrapolated if only individual hooks were lost

- Document what happened thoroughly in the logbook.

Fish Ticket Weights (Retained Species only)

Because fishers participating in the live fish market are extremely concerned about the condition of their fish, collecting samples of retained individuals may not be possible. If it is not possible to collect and weigh a sample of retained fish for average weights and visual estimates were not made, delivery weights (fish tickets) can be used to calculate the average weights of retained species. When using delivery weights:

1. ***Tally ALL retained individuals by species by haul.***
2. Observe the weighing of the fish by species upon landing, if possible. If not, ask the skipper for a copy or look at the weights on the fish ticket.
3. Calculate average weight of species by:

Calculation

$$\text{Average Species Wt} = \frac{\text{Landing Weight of Species (lbs)}}{\text{\# of Individuals of Species Caught During ENTIRE Trip}}$$

4. For each haul, calculate the weight of retained species.

Calculation

$$\text{Species Wt by Haul} = (\text{Average Species Wt}) \times (\text{\# of Individuals Caught in Haul})$$

Predated Pacific Halibut in Pot Gear

Occasionally Pacific Halibut may be predated upon by sand fleas, crabs, or other fish inside of a pot. Identification of these P. halibut is usually possible using the remaining parts of the fish, even when predation is severe. However if predation is severe, only the head and tail may be left in the pot making it impossible to length the fish.

In the event this occurs during your trip, do your best to estimate what the length of the fish would have been. Make a good note on your decksheet and discuss it with your debriefer.

Trip Discard

Dead Fish in a Live Fish Market

When vessel operators are selling to live fish markets, they generally do not want to land dead fish. Quotas for nearshore fisheries are relatively small, sometimes as low as 100 pounds for a 2-month period for a particular species. Dead fish have a small fraction of the value of live fish, and in some cases, buyers of live fish will not buy dead fish at all. When fish die in the live tank some vessel operators will keep them for personal use, while others may discard them before making a delivery. Fish retained for personal use may or may not be recorded on the fish ticket. If dead fish are brought in to port, they should be recorded in observer data as retained catch. If fish are discarded prior to the end of the trip, they should be recorded as discarded catch. Use Discard Reason 18 - Market (Dockside only) for fish discarded as discussed above.

Discard That Cannot Be Attributed to a Specific Haul

If there were multiple hauls in a fishing trip and discard occurs at the end of the trip, it is unlikely that the observer will be able to attribute the discard to a specific haul. In instances where the discarded species was only caught in one particular haul, the discard can be applied to that haul. Otherwise, discard that cannot be attributed to a specific haul is recorded on the Trip Discard Form.

Trip Discard Form Instructions

The Trip Discard Form is not entered into the database system. Document the information from the Trip Discard Form (See Figure 6-16) in the Trip Notes on the Trip Page in the database.

- **Trip Number**: Record the trip number generated by the database system.
- **Page Number**:The Trip Discard Form is numbered separate from all other forms. It should be numbered Page 1 of 1.
- **Date**: Document the month (MM) and day (DD) that the trip discard took place.
- **Time**: Document the time, in PST military time, that the trip discard took place.
- **Species**: Document the common name of the species that was discarded.
- **Weight**: Document the weight, in pounds, of species discarded.
- **# of fish**: Document the number of fish discarded (if known.).
- **Weight Method**: Document the weight method used to estimate the species weight.

  1 Actual weight
  6 Other
  7 Vessel estimate
  8 Extrapolation
  9 P. Halibut length/ weight conversion
  13 Tally Sample
  14 Visual experience
  19 P. Halibut length/ weight extrapolation

- **Discard Reason**: Record the skipper/crew's reason for discard for each species.

  11 Incidental/accidental
  13 Market
  14 Other
  15 Predation
  16 Regulation
  17 Safety
  18 Market - dockside only
  19 Utilized on board

- **Comments**: Document any additional information that is important.

Trip Discard Form

Page ____ of ____

Trip Number | | | | | |

Date		Time	Species	Weight	# of Fish	Weight Method	Discard Reason	Comments
Month	Day							

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This form should be used only if the discard can NOT be attributed to a specific haul!

Figure 6-16: Trip Discard Form